

Motivation Drivers of Millennials for engaging in crowdsourcing ventures

Mapping a profile for future customization of crowdsourcing initiatives



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Glossary

Crowdsourcing – Process of obtaining ideas, insights, knowledge, or other contributions towards a problem, by resorting to an online platform/community. Individuals participate in this problem solving initiative on their own free will.

Extrinsic and Intrinsic Motivation Theory – Two psychological paths of research of human being motivation. Extrinsic motivation theory defends that an individual is motivated to be involved in a venture due to the external benefits or outcomes he can reap. Intrinsic motivation defends that an individual involves himself in a venture aiming at achieving internal, personal goals through the participation.

Judgments – Judgments is the used term for the observation of a vignette survey. It consists of a response of a certain individual towards a scenario he was questioned about.

Millennium Generation – Although it varies, commonly, the Millennium generation consists of all individuals born between 1980 and 1996. Also known as Generation Y, this generation, that followed the Baby Boomers, are characterized by being technology oriented, tolerant, trend setting, globally aware, and collaborative.

(NPD) New Product Development – Term representative of the whole journey of a product launch in the market, from Idea Generation to Commercialization.

(OI) Open Innovation – A term promoted by Henry Chesbrough which defines the new paradigm of organizational innovation process. OI consists of a boundary blurring process in which organizations use both external and unconventional internal sources of ideas and knowledge for R&D and/or NPD. The innovation process in this approach is “open” in the sense organizations take advantage of a world in which knowledge is widely distributed. Partnerships, crowdsourcing, merging & acquisitions, parallel start-up, all of these are some examples of OI.

(R&D) Research & Development – Term that defines the development of new products or the appliance of scientific research in industrial fields.

The “crowd” – The term given to the participants, or prospective participants, of a crowdsourcing initiative. It represents all able individuals that can contribute towards a problem.

Vignette Survey (a.k.a. Factorial Survey) – Hybrid of experiment and social survey in which respondents are required to answer questions regarding a specific number of scenarios. These scenarios are detailed and descriptive, able to represent real life complex situations. The scenarios have certain variables embedded, which are posteriorly analyzed based on the respondents’ judgments.

WEB 2.0 – The term given to the evolution of the World Wide Web that started with the new 21st century. Represents a more collaborative, interactive, and interconnected online environment, that enabled the rise of technologies such as social media, cloud services, wikis, or blogs.

Abstract

Crowdsourcing, as the name implies, runs and succeeds on the *crowd* – the individuals who voluntarily dedicate their time towards this problem solving approach. Therefore, understanding the participation's underlined motivations is a crucial requirement towards an effective crowdsourcing venture.

Current research struggles with assessing these motivations while taking into consideration the variety of crowdsourcing scenarios. Simultaneously, there is a lack of a common motivational variable framework, on which literature can develop upon. To contribute towards these gaps, this research deploys a factorial survey to 174 respondents of the Millennium generation, through which it assesses this particular crowd's perception of four commonly analyzed motivational dimensions in current crowdsourcing motivation literature: Sense of Cooperation & Community; Monetary Compensation; Sense of Efficacy; and Signaling & Human Capital Advancement. Results found Monetary Compensation and Sense of Efficacy to be motivations supporting the millennial generation participation in crowdsourcing ventures. Research and managerial contributions are discussed, as well the limitations of this study.

Keywords: Crowdsourcing, Motivation, Open Innovation, Millennium Generation

Introduction

In the 20th century, organizations relied on gathering the brightest human capital in the market, investing considerable amount of resources, and locking the innovation process down to a highly confidential procedure. That was the path towards success and competitive advantage. However, a new century brought fresh angles and practices, evolution took its course, and certain influent factors arose that disturbed this perspective on innovation. Knowledge and workers became very mobile, and thus its total control and exclusivity became unfeasible. Simultaneously, private funding streams started to invest on small, emerging firms that focused on developing knowledge that had seeped from corporate research labs (Chesbrough, 2003). These smaller or new founded firms, facing a restriction on resources and unable to compete head on with the established organizations, exploited this “open wound” in the innovation mentality, and started to compete with big players in terms of novelty and new product development. How? By tapping into the so far untapped pool of knowledge of external stakeholders. Instead of focusing on a close R&D, for example, firms adopted behaviors such as start-ups acquisitions, partnerships development, or CRM approaches. Thus began the period of open innovation (Kam Sing Wong et al., 2012; Antikainen et al., 2010; Jiménez-Jimenez et al., 2008; Chesbrough, 2003).

Organizations understood and experienced the benefits that could be harvested from collecting knowledge and creativity from external sources, and therefore society witnessed closed innovation processes becoming more *open*. And within the multiple tools and approaches that open innovation enabled, crowdsourcing was one of them (López-Nicolás et al., 2011; Antikainen et al., 2010; Wallin et al., 2010; Chesbrough, 2003).

This OI practice established itself as a trend and gained both organizational and academic focus. As firms deployed this tool successfully, so grew the interest of academic research on this topic, with attempts at its explanation and conceptualization. Nevertheless, evolution does not delay, and the growth of the WEB

2.0 technologies reshaped open innovation, and with it crowdsourcing (Zhao & Zhu, 2014). The new digital ecosystem allowed crowdsourcing to embrace an *umbrella* nature, meaning that this OI practice became highly dynamic and customizable, with a multitude of approaches that blurred organizational boundaries and proper academic definition (Bogers & West, 2005; Marjanovic et al., 2012). Simultaneously, academic research on this topic suffered an evolution, and as crowdsourcing became more complex, new paths of study arose with the intent of deconstructing and understanding this phenomenon. One of the developed paths was a psychological one, focused on comprehending the core component of crowdsourcing, the element on which this practice bases its success upon – *the crowd* itself. Understanding that human beings were behind the functionality of crowdsourcing, academic literature trailed the psychological path of motivation, and searched for the reasons of why individuals engaged in this OI approach (Zhao & Zhu, 2014).

This research trend, still in an embryonic stage, has taken several approaches. Some researchers have developed theoretical frameworks based on previous motivational theories, such as extrinsic and intrinsic motivation theory, in order to advance the identification of the crowd's motivation (Zhao & Zhu, 2014). Others developed case studies and qualitative studies, such as interviews and crowdsourcing platform analysis, in order to understand crowdsourcing motivation directly through the perspective of its participant (Mudhi & Boutellier, 2011; Brabham, 2010). Simultaneously, other researches adopted a quantitative approach, aiming at testing specific motivational factors within potential participants of crowdsourcing ventures, in order to understand what drives *the crowd* towards participation (Zheng et al., 2011). And finally some researchers focused on developing meta-analysis of existent literature in crowdsourcing motivation, in order to organize and compile useful recommendations for the industry, and to provide a foundation for future research (Alshaikh et al., 2013; Gassenheimer et al., 2013).

However, current literature on crowdsourcing motivation requires research that addresses the crowdsourcing scenario heterogeneity characteristic, and the

dissension on motivational factors' significance. Meaning that: firstly, research finds it complex to incorporate in its studies the varied range of context in which crowdsourcing can be applied. This leads to dissimilar values and conclusions regarding certain motivational factors; and secondly, due to its embryonic stage, literature hasn't fully committed to a common framework of motivational variables. This implies that researchers statistically test their own variables, compiled from different motivation theories and other open innovation dimensions, but do not fully coordinate or consent on their outcomes (Zhao & Zhu, 2014).

This study aims at contributing to such issues, by compiling a list of motivational factors, which have been recurrently utilized in literature, and convert these into multiple crowdsourcing scenarios through a factorial survey. Each of these scenarios would be a representation of the possible combinations of these motivational factors. Individuals will then be questioned regarding their willingness to participate in those same scenarios.

This research provides an additional contribution to the literature by specifically inquiring individuals who belong to the Millennium Generation, also known as Generation Y. This generation grew simultaneously with crowdsourcing and the world of WEB 2.0 technologies. Consequently, they possess certain characteristics, such as social sharing, technology aptitude, brand identification, which clearly influence their motivational profile. It is then interesting to incorporate such factor into this research, to provide orientation on how crowdsourcing should be personalized to address this specific generation.

The results of this research would contribute towards mapping *the crowd's* motivational profile, and towards recommendations that would optimize the knowledge collection of future crowdsourcing initiatives. Ultimately, by taking this initial step towards a standardized, comprehensive motivational profile disclosure of the Millennium generation, this study aims at providing a solid, initial foundation for further development of the crowdsourcing motivation topic, while signaling

organizations how they can personalize this practice in the most efficient way possible towards the current working generation.

The paper is then organized as follows: a literature review is conducted, explaining the relationship between open innovation, crowdsourcing and crowdsourcing motivation. Simultaneously, a motivational factor list is compiled, based on the commonly analyzed ones in the gathered literature. These are converted into hypotheses and the conceptual model is represented. Posteriorly, the research approach is described. Next, the results from the research are reported. And finally, these results are discussed and conclusions are drawn, such as limitations, and managerial and research implications.

Literature Review

The collected literature encompasses articles about the evolution of open innovation, the definition of crowdsourcing and its evolution, and current status of crowdsourcing research. This enables the analysis between open innovation, crowdsourcing and its growing trend of motivation analysis. Concurrently, articles were gathered regarding: motivational case studies on successful crowdsourcing ventures; reviews of existent literature on crowdsourcing motivation; and empirical studies regarding extrinsic and intrinsic motivation factors in crowdsourcing. Such literature enables the collection of the commonly analyzed motivational variables and their respective studies' conclusions, which would contribute to the listing of the motivational factors to be tested *a posteriori*, in this research. Consequently, the following chapter will provide insights on the origins of open innovation and on how it relates with the rise of crowdsourcing. Subsequently, the concept of crowdsourcing will be explained together with the deconstruction of one of its core components, and the focus of this research: *the crowd*. The Millennium generation will also be shortly presented and its relationship with crowdsourcing explained. Finally, four hypotheses are formulated based upon the collected motivational variables, and a description of the conceptual model to be tested in this research is presented.

Open Innovation – A product of market evolution

The market has suffered a significant change since the era when companies resorted to mass-customization strategies to keep the consumer satisfied. Customer orientation and customization strategies arose to better understand the consumer needs (Antikainen et al., 2010). Marketing orientation and intelligence gained importance for the organizations as well. They realized that understanding the competition, your own resources, and capabilities before positioning yourself in the market, led to performance improvement (Kam Sing Wong et al., 2012; Antikainen et al., 2010; Jiménez-Jimenez et al., 2008).

The innovation process also accompanied this trend of change and has suffered a major turning point. Initially, organizations viewed innovation as something to be developed internally, in a highly closed process performed by the brightest and most experienced individuals available (Antikainen et al., 2010; Chesbrough, 2003). Not anymore. Nowadays it is observable the number of organizations, both big players and start-ups (Chesbrough, 2003), that increasingly resort to its stakeholders, such as suppliers and customers, for contributions towards the innovation process (Wallin et al., 2010). Firms have realized how cost-efficient and productive it is to tap into external creativity and expertise in order to extract additional knowledge, which if properly managed can then lead to competitive advantages (López-Nicolás et al., 2011; Antikainen et al., 2010).

Organizations boundaries have then become porous. What once was a closed controlled process is now open, collaborative and with proven results such as unique knowledge, innovation cost reduction, shared risk in product development, and even improved organization image (Wallin et al., 2010; Chesbrough, 2003).

Open innovation arose with the market evolution, and what was supposed to be a trend, became a viable and used approach, with its own strengths and weaknesses (Chesbrough & Brunswicker, 2014).

What is crowdsourcing? What is its relationship with Open Innovation?

OI, as an approach, does indeed dissipate the boundaries of the knowledge production and application by empowering organizations to resort to external sources, as previously mentioned. However, open innovation is "*finding a way to do something new*" (Hughes, 2013) and not directly the equivalent of increased innovation performance (Laursen et al., 2006). In fact, resorting to OI can be either positive or negative, meaning it can provide meaningful knowledge or ideas, but also can become quite costly to the point of overcoming any potential benefits. It depends on how organizations execute the open innovation process, on how they research their knowledge (Laursen et al., 2006). And this construct is undoubtedly

corroborated by reality, since it is observable that firms adopt different OI methodologies. For example, inbound and outbound openness - the collection of unexploited knowledge from within or outside the organization - are examples of OI approach variety (Freya et al., 2011). Cosh et al. (2011) also proves this variety in approaches through a survey on over 12.000 British enterprises. The results showed that depending on their resources and goals, companies would deploy different types of OI initiatives. And it is within these several customizable alternatives, of interacting with external stakeholders for knowledge exploration, that crowdsourcing can be found (Marjanovic et al., 2012).

Commonly, crowdsourcing can be referred as “*a practice of engaging someone to do a task for you. (...) Use the crowd*” (Hughes, 2013) and its first attempt at characterization, as mentioned by most of literature, can be attributed to Jeff Howe, in a *Wired* article of 2006:

“(...)Simply defined, crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call (...)”.

But the domain of crowdsourcing has progressed since then. The evolution of WEB 2.0 facilitated connectivity and collaboration between multiple stakeholders (Zhao & Zhu, 2014). This promoted the creation of an digital ecosystem, rich in online features, which reshaped consumption-production processes and stimulated a web social environment based on collaboration, participation and openness (Marjanovic et al., 2012). And crowdsourcing adapted to this technological and sociological reshape, assuming new approaches and eventually turning into an *umbrella* concept (Saxton et al., 2012; Bogers & West, 2005), meaning it encompasses many practices which blurs its definition boundaries (Bogers & West, 2005; Estellés-Arolas & González-Ladrón-de-Guevara, 2012).

This originated academic research efforts into mapping an exhaustive and consistent concept of crowdsourcing, one that would incorporate the current practices and models (Saxton et al., 2013; Estellés-Arolas & González-Ladrón-de-Guevara, 2012).

However, as to not deviate from the purpose of this research, and to facilitate the reading flow of this document, it is sufficient to refer to crowdsourcing as: "(...) *an online, distributed problem-solving and production model that has emerged in recent years. (...)*" (Brabham, 2008).

Crowdsourcing – Understanding and Motivating the Crowd

With the evolution of WEB 2.0 technologies (Zhao & Zhu, 2014; Saxton et al., 2012), open innovation boundaries blurred, allowing the development of various approaches in terms of external knowledge gathering (Bogers & West, 2005). Crowdsourcing is one of them.

Using crowdsourcing as an OI tool is an approach many organizations have increasingly adopted (Gassenheimer et al., 2013; Frey et al., 2011). And even though there is contradictory research highlighting its limitations (Poetz & Schreier, 2012; Euchner, 2010), the benefits from resorting to it are known and observable (Wallin et al., 2010; Chesbrough, 2003), and several studies have focused on its success cases (Alshaikh et al., 2013; Antikainen et al., 2010; Brabham, 2010). However, what is the right crowdsourcing model? What allows this OI practice to be successful, meaning, how does a firm efficiently collect external knowledge and convert it into increased innovative performance? Saxton et al. (2012) managed to identify nine distinct crowdsourcing models, such as peer-to-peer social financing model or product design model, and Gassenheimer et al. (2013) were able to map influential moderators in crowdsourcing effectiveness. However, as current research goes, given the *umbrella* nature of crowdsourcing (Bogers & West, 2005), it is very difficult to define an efficient conceptual model of this OI practice (Zhao & Zhu, 2014; Lukyanenko & Parsons, 2013). Despite the ambiguity regarding the conceptualization, literature identifies *the crowd* as one of the crucial agents in crowdsourcing. And since this practice is dependent on the willingness of these external sources to dedicate their effort and time into problem-solving situations,

that not their own, it is pertinent to explore what motivates them do so (Zhao & Zhu, 2014; Alshaikh et al., 2013; Gassenheimer et al., 2013).

Thus rose the research path of crowdsourcing motivation, which attempts to profile *the crowd* motivational factors through several theories (Zhao & Zhu, 2014), being the most explored one the extrinsic and intrinsic motivation theory (Alshaikh et al., 2013).

This theory explains that individuals who participate in crowdsourcing ventures do so driven by either, or both, extrinsic and intrinsic motivations (Alshaikh et al., 2013). Extrinsic refers to the incentives the task itself cannot provide, while intrinsic refers to the ones delivered by performing the task (Pilz & Heicko, 2013).

Current investigation on crowdsourcing motivation has commonly utilized this motivation theory for research (Alshaikh et al., 2013) however, due to the present embryonic state of the topic itself, there has not been a significant advancement in empirical studies. In the analyzed literature for this study, only Zheng et al. (2011) and Kauffman et al. (2011) employ a questionnaire on crowdsourcing participants, aiming at understanding whether extrinsic and intrinsic motivations influence the intent to participate. On the other hand, authors such as Brabham (2010) and Mudhi & Boutellier (2011) focus on more internal approaches, meaning they develop case studies and inquire individuals who belong to an organization, or are already quite familiar and integrated in online communities. Due to this difference in approach and context of crowdsourcing, findings contradict each other, regarding the importance of extrinsic and intrinsic variables (Zhao & Zhu, 2014).

Given these limitations, this research purpose is to study which motivational factors indeed influence the participation of the millennium generation *crowd*, by analyzing current literature on crowdsourcing motivation, compiling a list of most tested extrinsic and intrinsic motivations, and converting them into multiple scenarios through a factorial survey. With this approach, the limitations regarding variable use and crowdsourcing scenario homogeneity would be taken into consideration. Organizations would then have a clear guideline for crowdsourcing venture

customization, allowing for maximum crowd participation and, therefore, knowledge and creativity collection.

The Millennium Generation

From the analyzed literature for this research, only Brabham (2010) and Zheng et al. (2011) specifically pointed out the demographics of their interviewees, which ranged from the 18 years old to 30 years old. However, there was no exploration of the relationship between this demographic and the topic crowdsourcing.

The truth is that crowdsourcing is a recent OI practice, with scientific publications on the topic dating 2006. Simultaneously, the generation that grew witnessing the development of this OI approach are the *millenniums* – individuals born between 1980 and 1996 (Howe & Strauss, 2000). Consequently, there is a relationship worthy of exploration, since this generation possesses certain characteristics that facilitate the acceptance and use of crowdsourcing, such as technology aptitude, global awareness and the digital sharing lifestyle (Fulop, 2014; Snedecor, 2013). These characteristics are the result of certain evolutions in society and technology, which simultaneously reshape values and attitudes within the generation. Thus, such evolution in the psychological profile also signifies changes in expectations and motivation factors. Perhaps extrinsic motivations, such as compensation, no longer prove to be significant, and we witness a search for collaboration instead? Or is the eagerness to participate in the creation of something and recognition a bigger motivation?

This study deems important to begin highlighting such factor, and its consequences on crowdsourcing motivation. Consequently, the research will then focus on respondents that belong to that specific generation.

Crowdsourcing Motivation current literature status

Crowdsourcing is an established OI tool (Chesbrough & Brunswicker, 2014) and it has become a growing study focus in the academic research world however, certain aspects of its domain are yet to be properly explored (Zhao & Zhu, 2014). Such is the case with crowdsourcing motivation. Authors such as Zhao & Zhu (2014) highlight the importance of understanding the motivation of the crowd, if we wish to efficiently collect its wisdom and collective intelligence. They describe this topic as a future trend, and state that current research could benefit from academic focus on tackling scenario heterogeneity and motivation factor analysis inconsistency. They suggest a more theoretical research approach on this topic, in order to develop a consensus on the significance of motivation variables. Alternatively, Alshaikh et al. (2013) and Gassenheimer et al. (2013) embrace a more practical approach and perform a gathering of current crowdsourcing motivation literature, in an attempt to combine multiple findings and develop recommendations and theoretical frameworks. From the collected literature used in this research, only Alshaikh et al.'s article provides a listing of research focused on understanding crowdsourcing motivation factors, which is valuable for building an initial foundation for this study.

Due to its different approaches and extensive customization options, product of the digital era (Bogers & West, 2005), another path of research in crowdsourcing is the conceptualization (Zhao & Zhu, 2014; Lukyanenko & Parsons, 2013; Saxton et al., 2012).

Empirical studies involving the testing of motivation variables of *the crowd*, such as Zheng et al.'s (2011), Lakhani & Wolf (2005), and Kaufmann et al. (2011), provide clear and quantitative approaches that easily identify significant motivational variables. And finally, there are the articles which focus on cases studies and qualitative analysis of motivational factors of *the crowd* (Pilz & Gewald, 2013; Mudhi & Boutellier, 2011; Antikainen et al., 2010; Brabham, 2010).

The gathering and analysis of this literature allows for an understanding of current approaches and a collection of analyzed motivational factors and their findings. It will enable the next step, which will be the compilation of the commonly tested motivational factors and their significance test towards the *crowd's* willingness to participate in crowdsourcing ventures.

Crowdsourcing Motivational Factors, Hypotheses, and Conceptual Model

In order to achieve this study's goals, it is necessary to define the commonly analyzed motivational variables and represent them through multiple scenarios. However, due to the previously mentioned dissent on these variables, there is a need to process research and collect the most examined ones, and build a framework on it. Therefore, multiple qualitative and quantitative articles on crowdsourcing motivation were analyzed, and variables and conclusions on them were extracted. This led to the formulation of the following motivational factors.

Sense of Cooperation and Community

The first motivational factor for this research is "*Sense of Cooperation and Community*" (SCC). This intrinsic motive represents an individual desire to feel integrated in a collaborative environment, where actions and planning are commonly shared between members of that community. Simultaneously, the individual longs for a platform where one can find regular feedback and acknowledgment from other peers with similar motives and objectives (Kollock, 1999; Wasko & Faraj, 2000; Ridings & Gefen, 2004). Although the research was oriented towards open innovation communities, Antikainen et al. (2010) evaluates this concept and concludes that sense of cooperation & community empowers the *crowd* to be creative and participative. Brabham (2010), through his case study on *Threadless*, reinforces the importance of this motivation factor. Named "*love of community*", this variable, originated from the performed interviews on *Threadless* users, is considered as a main driver to participate in the brand's design challenges. Although not the highest

ranked motivational factor, Pilz and Gewald (2013), in a non-profit crowdsourcing focus (*MobileWorks*), and Kaufmann et al. (2011), in an open source software focus (*MechanicalTurk*), also concluded that community/obligation and social contact as intrinsic motivations are considered to have influence in an individual's participation. Even though gathered literature focus on analyzing this variable in other contexts rather than crowdsourcing, all practices belong to the open innovation dimension and therefore, for this research, SCC is considered an independent variable and used in the formulation of the first hypotheses:

H1: Sense of Cooperation & Community is positively associated with the willingness to participate in crowdsourcing ventures.

Monetary Compensation

The second motivational factor developed for this research is "*Monetary Compensation*" (MC). This extrinsic motive is the most analyzed on crowdsourcing motivation literature (Zhao & Zhu, 2014), and represents the individual's desire to be monetarily rewarded for participating in crowdsourcing initiatives (Wasko & Faraj, 2000).

Antikainen et al. (2010) and Frey et al. (2011), in a context of open innovation communities, assessed monetary rewarding for its effect in participation and found a significant positive relationship between the two. Brabham (2010) and Zheng et al. (2011) also tested whether the opportunity to make money affected participation in crowdsourcing ventures. The results, however, differed: while through the interviews at *Threadless*, Brabham found the "*opportunity to make money*" to be a clear motivation, Zheng et al. did not find significant statistical evidence of rewarding being positively associated with participation.

Kaufmann et al. (2011) and Lakhani and Wolf (2005) in the context of open source software, state that immediate payoffs are positively associated with participation.

Oppositely, Pilz and Gewald (2013), in a context of non-profit crowdsourcing, find that this dimension is not relevant towards participation.

Again, due to the embryonic stage of crowdsourcing motivation literature, open innovation dimensions other than crowdsourcing had to be researched, such as OSS and OI communities. However, enough literature focus was given to this motivational factor, justifying its integration in this research as an independent variable:

H2: Winning, Competition & Rewards for Participation is positively associated with the willingness to participate in crowdsourcing ventures.

Sense of Efficacy

The third motivational factor in this research is "*Sense of Efficacy*" (SE). This intrinsic motivation represents an individual's wish to contribute to tasks that make use of his specific set of skills. This means that an individual is motivated to participate in crowdsourcing ventures that possess task and skill variety and that enable him to contribute based on his knowledge expertise (Bandura, 1995; Kollock, 1999; Wasko & Faraj, 2000; Ridings & Gefen, 2004).

Pilz and Gewald (2013) analyze this motivational factor in their research and concluded that, as an intrinsic motivation, SE was not as significant towards participation, when compared to extrinsic motivations. Frey et al. (2011), in an open innovation community context, assessed SE influence on participation and disclosed a positive relationship, showing that crowdsourcing ventures benefit from focusing on the participants' cognitive attributes. Kaufmann et al. (2011) concurrently demonstrates, in an open source software development perspective, that the consideration for skill variety in tasks translates into participation from *the crowd*. Finally, Zheng et al. (2011), in their empirical study on over 280 crowdsourcing participants, concluded that future ventures should focus on individuals' skill variety. The following hypotheses is then formulated and integrated in this research:

H3: Sense of Efficacy is positively associated with the willingness to participate in crowdsourcing ventures.

Signaling and Human Capital Development

The fourth and last motivational factor developed for this research is "*Signaling and Human Capital Development*" (SHCD). This extrinsic motivation represents an individual's wish, through the participation in a crowdsourcing venture, to be able: to develop one's skills and acquire others that represent added value in his professional path; and to be able to demonstrate proficiency in a certain topic / situation and thus gain possible future employers' attention (Wasko & Faraj, 2000; Bogozzi & Dholakia, 2002; von Hippel & von Krogh, 2003).

On a crowdsourcing level, Brabham (2010), through his interview process with *Threadless* participants, concluded that individuals who participated did so in order to develop one's skills and potentially take freelancer's work. Zheng et al. (2011) also took this intrinsic factor into account for their research, and unveiled a positive relationship between the desire to gain recognition and participation in crowdsourcing ventures.

Although focusing on a different open innovation dimension – open source software – Kaufmann et al. (2011) and Pilz and Gewald (2013) address this motivational factor in their research. Both articles expose a positive relationship between this motivation and participation, although Pilz and Gewald (2013) advance the findings and contradict the previous authors, by attributing more importance to SHCD in detriment of intrinsic motivations.

Given the existent focus in the literature and the interesting evolution, as represented in Pilz and Gewald's (2013) research regarding its importance towards participation of *the crowd*, SHCD is embedded in this research as an independent variable and represented as the following hypotheses:

H4: Signaling and Human Capital Advancement is positively associated with the willingness to participate in crowdsourcing ventures.

Conceptual Model

The dependent variable of this study will be “*willingness to participate*” (WP). It represents the willingness of an individual participating in a crowdsourcing venture. It is commonly represented in literature that focus on crowdsourcing motivation, and its understanding allows the deconstruction of the participants’ motivational profile, in order to optimize future crowdsourcing events and maximize knowledge collection (Zhao & Zhu, 2014; Alshaikh et al., 2013; Gassenheimer et al., 2013).

The conducted research will then focus on whether the previously four mentioned motivational factors do influence, and how, the willingness to participate in crowdsourcing initiatives of the Millennium Generation (Figure 1). Concurrently, the model will also control for previous experience in crowdsourcing venture and level of education of the individual.

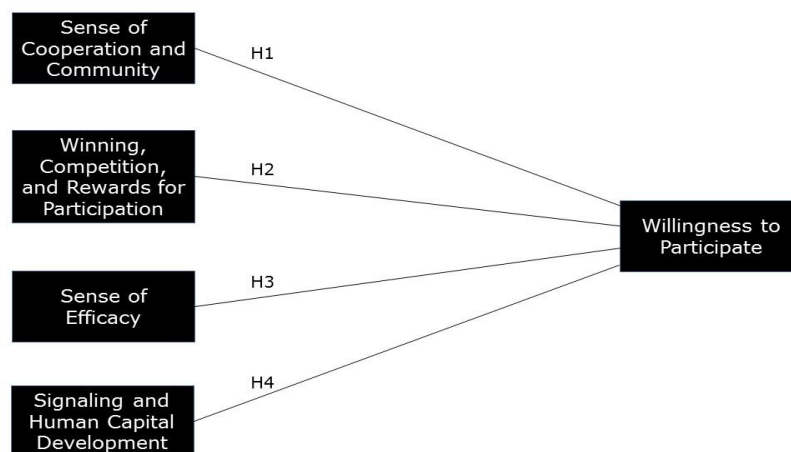


Figure 1

Research Methodology

In this research, two issues regarding crowdsourcing motivational literature were identified. Developing the previous hypotheses is this study's response towards the first issue – the usefulness of a common motivational variable framework, in current literature. The following opted research methodology is the study's response towards the second issue - the unconsidered crowdsourcing scenario heterogeneity.

In order to deploy the appropriate methodology that embodied the aims of this research, a data collection approach had to be selected based on its ability to epitomize several scenarios of crowdsourcing. The factorial survey, also known as vignette survey, given its characteristics, was the selected approach.

Introduced by Rossi and Anderson in 1982, the vignette survey was, and has been, used extensively in judgment and behavior observation, especially in a medical/psychological scope (Ludwick & Zeller, 2001). It consists of an experimental multilevel design approach, in which we convert variables into short descriptions or stories, known as vignettes, in order to represent complex real world situations. Respondents are then asked to judge/comment on that scenario based on the independent variable(s) that are being assessing. The product of such approach can ultimately contribute to the formulation of concepts or the assessment of judgment from different people on complex situations (Ludwick & Zeller, 2001).

In the scope of this research, the vignette survey represents the appropriate option, for in it there is the opportunity to convert our previous four developed hypotheses into coherent diverse scenarios, therefore assessing these motivational factors importance while tackling the scenario homogeneity issue.

Having defined the approach, the next step is to formulate the vignettes. For feasibility of the factorial survey, the four variables - SSC, MC, SE, and SHCD – only assume the values of 0 or 1, representing the "low" or "high" presence, respectively, of that variable in the scenario. Restricting to a binary approach is necessary due to the necessity of creating new combinations of values, and therefore more scenarios, with each new classification item in the scale.

(E.g.: If three classifications were used for each variable – such as low; medium; high – the factorial survey would be composed of 81 different scenarios. Given the scope and resources availability of this research, such situation would be impractical).

Each scenario represents a combination of two possible values (0 or 1), for each of the four variables (SSC, MC, SE, SHCD), as observable in Figure 2. As of consequence, sixteen vignettes were developed (2^4), each converted into a short story, representing a crowdsourcing venture.

(E.g.: Scenario 7 is a short story which underlined has the values: SSC(1), MC(0), SE(0), SHCD(1), meaning this is a short story that represents a real world situation of high sense of collaboration & community, low focus on monetary compensation, low sense of efficacy, and high signaling and human capital advancement).

	SCC	MC	SE	SHCD
Scenario 1	H	H	H	H
Scenario 2	H	H	H	L
Scenario 3	H	H	L	H
Scenario 4	H	H	L	L
Scenario 5	H	L	H	H
Scenario 6	H	L	H	L
Scenario 7	H	L	L	H
Scenario 8	H	L	L	L
Scenario 9	L	H	H	H
Scenario 10	L	H	H	L
Scenario 11	L	H	L	H
Scenario 12	L	H	L	L
Scenario 13	L	L	H	H
Scenario 14	L	L	H	L
Scenario 15	L	L	L	H
Scenario 16	L	L	L	L

SCC	Sense of Cooperation & Community
MC	Monetary Compensation
SE	Sense of Efficacy
SHCD	Signaling and Human Capital Development
H	High
L	Low

Figure 2

With the scenarios formulated, the next phase was to develop the survey. The vignettes were incorporated in the questionnaire however, a limit and randomization rule was implemented, allowing the prospective respondent to answer only to four

scenarios, randomly selected by the used software. Since the vignettes are quite descriptive and require the respondent's full attention, these conditions were implemented in the survey to assure its feasibility, and to not consume too much time or effort from the respondent, therefore controlling the incompleteness/dropout ratio.

The goal was for the respondents to read the scenario, which described a crowdsourcing initiative, and rate their willingness to participate in terms of percentage, from 0% to 100%, being 0% "would not participate" and 100% "would participate". Simultaneously, questions representing control variables were included in the questionnaire, controlling for education and prior involvement in crowdsourcing ventures.

Once the survey was completed, a test group of 20 individuals was initiated. These were specifically selected based on their age (21-25), and within an MSc academic background. Such criteria allowed for an initial feedback from individuals of the Millennium Generation but also for some expertise, or at least, some understanding of an academic research questionnaire. The group proofread for content and readability.

Finally, through a convenience sampling method, the questionnaire was sent to 256 individuals. Only 174 completed the survey successfully, therefore having a completion rate of 68%. A description of the pool of respondents can be found in the Appendices.

Data Analysis and Results

The collected observations through this method can be properly analyzed with an Ordinary Least Squares (OLS) regression (Ludwick & Zeller, 2001). This approach provides the necessary statistical data, such as effect sizes and statistical significances, to interpret the pertinence of the previously developed four motivational dimensions.

Prior to the regression analysis, the data collected through the survey needed to be treated and converted into a viable input for the regression. This is due to the fact that the respondents do not directly represent an observation. As stated by Rossi & Anderson (1982), *"If each n respondent rates separate respondent subsamples of m factorial objects, the resulting data are $nm = N$ judgments."* Therefore, one judgment represents one observation. In this research, 174 respondents answered 4 random subsamples of the 16 possible ones. This translates into 692 observations for the regression. Due to the elimination of some incongruent judgments however, the amount of observations used in the regression are 682.

An OLS regression was then run on 682 observations. The produced model possessed an adjusted R square of 0,021, which translates into a poor capacity of explanation of the independent variable's variance (Table 8 in the Appendices). However, the F-test for the regression proved that the model indeed has explanatory power (F-test: 3.373; p -value < 0.05), as seen in Table 1.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14574,731	6	2429,122	3,373	,003 ^b
	Residual	477528,081	663	720,254		
	Total	492102,812	669			

a. Dependent Variable: Willingness_to_Participate

b. Predictors: (Constant), Education, SHCD, SE, MC, Experience, CC

Table 1

Regarding the control variables ("*Education*" and "*Experience*"), the model identifies a statistically significant negative influence between willingness to participate and previous involvement in crowdsourcing ventures (β : -0.109; p -value < 0.05). On the other hand, education level does not possess a significant relationship (p -value: 0.884).

As for the results on the tested hypotheses, as seen in the table below, the model demonstrates that Sense of Cooperation & Community is not statistically significant, when explaining the variance of the independent variable (p -value: 0.864). Signaling & Human Capital Advancement, as an explanatory motivational factor, fails to reach a significant positive relationship with willingness to participate (β :-0.109; p -value: 0.153). Regarding Sense of Efficacy, it presents a significant and positive relationship with willingness to participate, at a 0.1 level (β : 0.065; p -value: 0.089). Lastly, the model demonstrates Monetary Compensation to have a statistically significant positive relationship with the independent variable (β : 0.110; p -value < 0.05).

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	65,940	7,855		8,395	,000
CC	-,279	2,095	-,005	-,133	,894
MC	5,940	2,082	,110	2,853	,004
SHCD	2,988	2,087	,055	1,432	,153
SE	3,548	2,085	,065	1,702	,089
Experience	-7,162	2,530	-,109	-2,830	,005
Education	-,222	1,524	-,006	-,146	,884

a. Dependent Variable: Willingness_to_Participate

Table 2

This OLS regression's results consequently refute H1 and H4 assumptions. Concurrently, H2 and H3 have been supported by the regression, as seen in the following table.

Scenario	P-value	Status
<i>H1: Sense of Cooperation & Community is positively associated with the willingness to participate in crowdsourcing ventures.</i>	0.894	Not Supported
<i>H2: Monetary Compensation is positively associated with the willingness to participate in crowdsourcing ventures.</i>	< 0.05	Supported
<i>H3: Sense of Efficacy is positively associated with the willingness to participate in crowdsourcing ventures.</i>	0.089	Supported (At a 0.1 level)
<i>H4: Signaling and Human Capital Advancement is positively associated with the willingness to participate in crowdsourcing ventures.</i>	0.153	Not Supported

Table 3

Discussion

In order to advance the field of crowdsourcing motivation research, this study developed a model in which it tests four motivational variables regarding their influence on a Millennium generation individual's willingness to participate in crowdsourcing ventures. These variables are gathered through the identification of the « commonly analyzed motivation dimensions in the gathered crowdsourcing motivation literature.

The model proved to be significant although merely able to represent about 2% of the Millennium generation willingness to participate in crowdsourcing ventures (Appendices, Table 8). Two of the hypotheses were supported, while the remaining two revealed to be statistically insignificant.

Sense of Cooperation & Community (*H1*) proved to be statistically insignificant which is not consistent with previous literature. Pilz and Gewald (2013), Kaufmann et al. (2011), Antikainen et al. (2010), and Brabham (2010) defend this dimension as relevant for participation. This difference can be explained by the specific context in which these authors assessed the motivational factor. Brabham (2010) focused his research on a crowdsourcing platform – *Threadless* – and inquired individuals with significant experience and fully integrated in the platform's community. Kaufmann et al. (2011) also addressed workers of a specific open source software platform, meaning individuals with in-house experience and understanding. Concurrently, Antikainen et al. (2010) specifically researched on three case studies regarding OI communities of crowdsourcing ventures. In all these approaches, it is observable an assessment of the motivational dimension through an internal perspective. One could argue that the collected observations for this dimension analysis are then biased in the sense that they represent experienced, integrated in the system, perspectives. Oppositely, this study develops scenarios that embody the concept of collaboration to be presented towards prospective participants, who have not yet been involved in them. The individual understands, through interpretation, the existence of a collaboration/community component, but his response regarding participation is

exempt from possible internal influences, derived from previous integration in the venture. Therefore, a possible explanation for this outcome dissension between researches may be that sense of collaboration & community is a factor for continuation/retention in, but not for initial attraction towards, a crowdsourcing venture.

Monetary Compensation (*H2*) proved to be statistically significant and possesses a positive relationship with willingness to participate. This result is supported by most of analyzed research. For example, Kaufmann et al. (2011) demonstrated, within the scope of open source software, how this motivational dimension was the highest ranked one in terms of motivation drivers. Concurrently, Brabham (2010), through his research on *Threadless* contributors, found the desire to make money a clear motivation towards participation in the platform. However, this outcome does contradict certain findings on previous research. Pilz and Gewald (2013), in a non-profit crowdsourcing environment (*MobileWorks*), found this driver to be insignificant. Such contrast in outcomes can be explained by the nature of the platform itself, which filters individuals governed by this intrinsic motivation. Simultaneously, Zheng et al. (2011), in their research, found no relationship between being compensated and intent of participation in a crowdsourcing venture. Zheng et al. argues that this outcome regarding payment, which opposes literature supporting monetary compensation as significant, can be explained by the difference in underlying cultural values. Meaning that the Chinese *crowd* is motivated by the procedure and subjective experience of undergoing the task, while Western mentality, such as the American, is more prone towards the utilitarian and goal aspect of the task (Zheng et al., 2011). It is possible to extract insight from this argument and realize that the outcome dissension regarding monetary compensation, between this study and Zheng et al.'s research, may also have roots in the cultural differences between the Chinese and European mentality.

The model showed a positive significant relationship between Sense of Efficacy (*H3*) and willingness to participate, corroborating previous studies regarding this

motivational dimension. Whether in a crowdsourcing environment (Pilz & Gewald, 2013; Zheng et al., 2011), open source software (Kaufmann et al., 2011), or open innovation communities (Frey et al., 2011), focusing on task variety, and developing ventures that make use of the participants specific set of skills, proved to be a characteristic that drives participation in crowdsourcing ventures.

Finally, Signaling and Human Capital Advancement (*H4*) proved to be statistically insignificant, contradicting the outcomes of previous literature. Brabham (2010) found that *Threadless* participants contributed in order to develop their skills and signal for potential freelancer's work. Simultaneously, Zheng et al. (2011) disclosed that recognition gain from the crowdsourcing initiatives' sponsors was a motivational driver for Chinese contributors at *Taskcn*. Pilz and Gewald (2013) and Kaufmann et al. (2011), in contexts of crowdsourcing and open source software, respectively, found evidence of this extrinsic dimension to be relevant towards participation.

These conflicting outcomes can be explained by several factors. Firstly, crowdsourcing has certainly been used by organizations in different scopes however, it is not a formal and daily used practice, nor it is widely identifiable by most people. Therefore, if individuals do not possess a certain understanding of the concept of crowdsourcing, it may prove to be difficult for them to identify how participation in such an initiative may lead to potential benefits regarding skill advancement or signaling opportunities to prospective employers. Secondly, one may argue that this dimension is intensely related to both the industry and sponsor/creator of the crowdsourcing venture. Meaning that if an individual's skills and professional background/ambitions match to some extend the scope of the initiative, it is likely that this dimension will weight towards their participation. Lastly, the reputation of the sponsor/creator of the crowdsourcing initiative should have an influence on the participants' inclination, towards participating for signaling or developing his skills. If for example, a renowned organization in project management or consultancy initiates a crowdsourcing venture, and if the individual's interest lay in the consultancy scope, it is plausible to observe an increased weight of this motivational dimension towards

participation. However, in this study, throughout the launched questionnaire, we presented respondents with many hypothetical scenarios. This was done in order to reduce the effect of notoriety/preference regarding organizations, and therefore obtain the most unbiased judgment as possible regarding the motivational variables. Regarding the control variables, education proved to be insignificant towards willingness to participate, which is consistent with Zheng et al. (2011) research on *Taskcn* contributors. Interestingly, previous participation in crowdsourcing ventures proved to be negatively associated with willingness to participate (Table 8). Unexpected, this outcome may be explained by the small number of respondents that participated in previous ventures (Appendices, Table 5), and by the possible negative or unsatisfactory experiences that these individuals might have had in the past.

Conclusion

Crowdsourcing consists of an open innovation practice that has increased, throughout the years, its notoriety and application. The evolution of WEB 2.0 technologies furthered this growth and enabled crowdsourcing a multitude of approaches and an increased reach. However, crowdsourcing successful application is not exclusively related to technological requirements. Its adherence and benefit collection is highly dependent on a crucial component – *the crowd*. The individuals who participate in these initiatives are doing so through their own free will and therefore, it is pertinent to understand their underlined motives. This will allow for an efficient customization of future crowdsourcing ventures, leading to effective attraction and optimal collection of external knowledge.

The academic world simultaneously accompanied this focus, and has dedicated resources towards the comprehension of the motivational profile of crowdsourcing participants.

Consequently, this study has been developed with two main objectives. The first one is to tackle specific issues with current crowdsourcing motivation literature – the disregard for crowdsourcing scenario heterogeneity and the inexistence of a common motivational variable framework – in order to advance the current state of research. The second one is to provide a motivation profile of the Millennium generation, the current and future workforce, so that organizations with imminent intent of organizing crowdsourcing ventures may do so in an optimal way.

A vignette survey was developed, composed of sixteen scenarios, each describing a situation which embeds a combination of four motivational dimensions – Sense of Cooperation & Community; Monetary Compensation; Sense of Efficacy; and Signaling & Human Capital Advancement. Based on 682 observations, it was discernable that the Millennium generation is motivated by a combination of both extrinsic and intrinsic motivations, specifically Monetary Compensation and Sense of Efficacy. Meaning that this generation, when it comes to crowdsourcing initiatives, feels more inclined towards participation if the venture implies some sort of monetary

compensation system, and if it possess a certain level of skill variety, enabling the individual to contribute through his specific set of skills or knowledge.

Limitations

This research possesses certain limitations that should be taken into consideration when generalizing the results for the remaining population.

The first limitation consists of the fact that the analyzed motivational dimensions do not represent the totality of factors that influence an individual's willingness to participate in crowdsourcing. The chosen variables represent the commonly analyzed ones, meaning they are tested in most of the researched crowdsourcing motivation literature for this study. Other variables, from different motivation theories and scopes of open innovation, could and should be assessed.

Another limitation lays in the used methodology – the vignette survey. It consists of an experiment and social survey hybrid, in which the respondent answers previously designed scenarios. And although these scenarios were designed to represent, in the most unbiased, descriptive, and realistic way possible, combinations of the studied motivational dimensions, they are still written by the researcher, and not based on existent, peer-reviewed scales. Therefore, the scenarios will always be subjective and representative of the researcher's perspective on a specific motivation dimension. Simultaneously, this chosen methodology limited the number of motivational dimensions with which this research could work with.

Finally, the 174 respondents from which the data was collected were selected through a convenience sampling method, and mostly from an advanced educational background. Consequently, some of their characteristics or motivations may not be representative of the overall population.

Research Contributions & Implications

Firstly, this research is one of the first using a vignette survey approach to understand motivational drivers behind individuals' willingness to participate in crowdsourcing. This methodology answers the issue raised by Zhao and Zhu (2014) regarding the disregard for the scenario heterogeneity, which is a characteristic of the crowdsourcing phenomena. This means that previous literature, in their motivation research, could further their consideration towards the multitude of possible crowdsourcing scenarios. As of consequence, new studies could avoid dissimilar outcomes on the same variable. By presenting individuals with different scenarios, each embedding different motivation dimensions, this research tackles such issue.

Secondly, the collection and usage of four commonly analyzed motivational drivers is a response towards the necessity for a common motivation dimension framework. Current literature focuses on different open innovation scopes and motivation theories, and develop and test certain motivation dimensions without consorting on a shared framework (Zhau & Zhu, 2014). By collecting and assessing motivational dimensions analyzed in many researches, this one aims at contributing towards a foundation for a standardized, single motivational variable framework for crowdsourcing motivation.

Lastly, this study adds on current literature in crowdsourcing motivation by focusing on a specific generation – the Millennium generation – in order to understand the motivational profile towards crowdsourcing of the current, and forthcoming, main workforce portion of society.

Future crowdsourcing motivation research could further its topic by building upon this study's initial framework. The OLS regression proved how embryonic the explanation capacity of these current motivational variables is (*Adj-R2: 0.02*), so new academic endeavors could test for, and include, new motivational factors, in order to advance the mapping process of the motivational profile of crowdsourcing participants. Simultaneously, an interesting path would be to assess the motivational profiles of

both business and non-profit crowdsourcing participants. Given the capacity for vignette surveys to represent complex real life situations, the customization possibilities are extensive and therefore new academic initiatives could adopt this study's methodology in order to develop scenarios for the different crowdsourcing scopes. Pilz and Gewald (2013) did so by using Kaufmann et al. (2011) motivation dimensions regarding participants of a profit oriented open source software platform – *MechanicalTurk*. They build upon the same analyzed factors and applied the methodology towards a non-profit crowdsourcing platform – *MobileWorks*, proving meaningful differences that should be further investigated.

Further research could also specifically address certain subgroups of the Millennium Generation. The collected pool of respondents for this research is mostly composed by individuals between the age of 22 and 26, currently undergoing an academic degree. However, the Millennium Generation also encompasses, for example, the 30 year old individual completely integrated in its professional area, or the 19 year old individual on an academic hiatus. As of consequence, the motivations of these individuals might be influenced by certain external and internal factors which differ from the ones that this study's pool of respondents are in contact with. Such difference in environment can then lead to alternative motivational profiles, which are worthwhile exploring.

Practical Implications

By focusing on the Millennium generation, this research aimed at understanding the motivational profile of a generation that represents the current, and future, workforce of society. This allows for insights that have a certain level of usefulness for organizations which wish to explore the path of knowledge gathering through crowdsourcing.

The Millennials grew with the crowdsourcing phenomenon and therefore can yield the most participation and, as of consequence, the most knowledge collection for organizations. Their characteristics, such as social sharing, emphasis on brand

relationship, technology aptitude, trend setting, longing for participation and opinion contribution towards ventures' development, match the principles of open innovation and facilitate the adoption of its derived practices. By understanding their motivational profile, organizations possess a tool that will enable an efficient level of crowdsourcing customization. Meaning that future ventures will be designed with respect towards this generation expectations, and consequently triggering the Millennials' interest and guaranteeing an optimal participation in crowdsourcing initiatives.

On a practical level, this study has then found that crowdsourcing entities, which wish to collect knowledge from this particular generation, must be prepared to implement some sort of monetary compensation system attractive enough so that the Millennial finds its spent resources appropriately acknowledged and rewarded. Simultaneously, in order to guarantee his participation, crowdsourcing entities must tailor the crowdsourcing venture towards the specific skills of the millennial participant. Meaning that the task must possess enough skill variety and appropriateness towards the contributor's set of skills, so that he finds a sense of usefulness, and meaningfulness, while engaging in the activity.

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Appendices

Pool of respondents' description

What is your age?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 18	2	1,1	1,1	1,1
19	4	2,3	2,3	3,4
20	5	2,9	2,9	6,3
21	25	14,4	14,4	20,7
22	36	20,7	20,7	41,4
23	36	20,7	20,7	62,1
24	30	17,2	17,2	79,3
25	24	13,8	13,8	93,1
26	4	2,3	2,3	95,4
27	5	2,9	2,9	98,3
28	1	,6	,6	98,9
30	1	,6	,6	99,4
32	1	,6	,6	100,0
Total	174	100,0	100,0	

Table 4

What is your gender?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Male	84	48,3	48,3	48,3
Female	90	51,7	51,7	100,0
Total	174	100,0	100,0	

Table 5

What is your highest level of education?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid High School	20	11,5	11,5	11,5
Bachelor	81	46,6	46,6	58,0
Master	72	41,4	41,4	99,4
Other	1	,6	,6	100,0
Total	174	100,0	100,0	

Table 6

Have you ever been involved in a crowdsourcing initiative?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	13,8	14,0	14,0
	No	140	80,5	81,9	95,9
	I do not know	7	4,0	4,1	100,0
	Total	171	98,3	100,0	
Missing	System	3	1,7		
Total		174	100,0		

Table 7

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,172 ^a	,030	,021	26,8375

a. Predictors: (Constant), Education, SHCD, SE, MC, Experience, CC

Table 8